

Remarks

This substitute amendment is submitted in response to the Advisory Action mailed June 20, 2006. The Final Rejection in this application was mailed March 23, 2006. A request for a one-month extension and the associated fee accompanies this substitute amendment.

Review and reconsideration of this application are respectfully requested in view of this substitute amendment.

Claims 3 and 9-20 have been canceled by this amendment. Claims 1-2, 8 and 21-22 remain in the present application.

No new matter has been added as a result of the amendments to claim 1, 2 and 8, nor is it believed that the amendments would cause any undue additional search or effort on the part of the Office.

The After Final Amendment filed June 6, 2006 was not entered because the Examiner alleges that the deletion of "as the tubular structure" in the third line of claim 20 raises new issues that would require further consideration and/or search.

The examiner further suggests that since claim 20 provides for the use of the tubular structure recited in lines 3-12, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass.

In view of the above amendments wherein claim 20 has been canceled, it is now believed that there is no longer any issue of new matter that would require further consideration and/or search. Accordingly, applicant respectfully requests that this substitute amendment be entered.

It is again noted that the repeated rejection of claims 1-4, 6-10 and 20-22 made of record in the previous office action is under 35 U.S.C. 102 rather than the presently indicated 35 U.S.C. 103.

The tubular structure of the present invention consists essentially of about 30 to 75% of an ethylene-vinyl acetate copolymer; 0 to about 50% by weight of a polymeric material selected from the group consisting of ethylene-propylene-diene terpolymer (EPDM), styrene-butadiene rubber (SBR), acrylonitrile-butadiene rubber (NBR), ethylene-propylene rubber (EPR), butyl rubber, cis-polybutadiene, cis-polyisoprene, polyurethane, polyamide, and mixtures thereof; and about 25 to 70% of one or more additives selected from the group consisting of process aids, fillers, plasticizers, metal oxides, metal hydroxides, peroxides, coagents, antioxidants and combinations thereof, as defined in claim 1 (the only independent claim remaining).

Igarashi et al., on the other hand, teach a refrigeration transport hose comprising an inner tube comprising a refrigerant gas-impermeable resinous layer formed of a very specific polyamide resin produced by the reaction of hexamethylene diamine and an aliphatic dicarboxylic acid having eight to sixteen carbon atoms (CPA resin); an outer rubber layer; and a reinforcing fiber layer between the inner layer and the outer layer. Igarashi et al have found that common polyamides resins are not suitable and that only the specific polyamide resin produced by condensation of hexamethylene diamine and an aliphatic dicarboxylic acid whose molecule has 8 to 16 carbon atoms is satisfactory in regard to the three requirements (of their invention), i.e., high gas impermeability, flexibility and heat resistance (col. 2, lines 33-43). In one embodiment, the inner layer contains 100% of the CPA resin (col. 3, lines 30-31). In a second embodiment, the inner layer further contains a saponified ethylene-vinyl acetate copolymer in addition to the CPA resin (col. 3, lines 32-34). The examiner alleges that the saponified ethylene-vinyl acetate copolymer of Igarashi et al contains ethylene-vinyl acetate copolymer, but provides no evidence to support his allegation.

It appears that the issues involved here are (A) whether the tubular structure of the present

invention as defined by claims 1,2, 8 and 21-22 preclude the presence of the CPA resin with or without the saponified ethylene-vinyl acetate copolymer of Igarashi et al, and (B) whether the saponified ethylene-vinyl acetate copolymer of Igarashi et al is ethylene-vinyl acetate copolymer.

As stated earlier by applicant, the saponification of an ethylene-vinyl acetate copolymer does not simply provide a polymeric mixture of ethylene-vinyl acetate copolymer and ethylene-vinyl alcohol copolymer. Once the saponification has occurred, the resulting polymer is either an ethylene-vinyl acetate-vinyl alcohol terpolymer or an ethylene-vinyl alcohol copolymer, depending on the degree of saponification. Applicant contends that chemically and structurally, ethylene-vinyl acetate copolymers and saponified ethylene-vinyl acetate copolymers are distinctly different from one another. Ethylene-vinyl acetate copolymer has the structure (1):



(1)

while saponified ethylene-vinyl acetate copolymer (ethylene-vinyl acetate-vinyl alcohol terpolymer where less than all of the pendant acetate groups are converted, i.e., saponification is less than 100%) has the structure (2):



(2)

When saponification is 100% where all of the pendant acetate groups have been converted to hydroxyl groups, the saponified ethylene-vinyl acetate copolymer is polyvinyl alcohol. As shown in structure (2), the polymer chain contains "m-n" acetate groups and also contains "n" hydroxyl groups, and the resulting polymer is an ethylene-vinyl acetate-vinyl alcohol terpolymer. The numerical values of the numerals "m-n" and "n" are determined by the degree of saponification. When the value of "n" is equal to the value of "m", saponification has reached 100% and there is no longer any pendant acetate groups present in the polymer chain; therefore, the resulting

polymer is an ethylene-vinyl alcohol copolymer. When the value of "m" is larger than "n" and "n" is not zero, the resulting polymer is ethylene-vinyl acetate-vinyl alcohol terpolymer (structure 2). Where "n" is zero, the polymer is not a saponified ethylene-vinyl acetate copolymer. Igarashi et al recommends that the saponified ethylene-vinyl acetate copolymer contain not more than 40 mol % of ethylene and not less than 90 mol % vinyl acetate of the ethylene-vinyl acetate be saponified (col. 3, lines 39-42). Therefore, one would reason that Igarashi et al desires an ethylene-vinyl acetate-vinyl alcohol terpolymer where the numerical value of the numeral "n" is nearly equal to the numerical value of "m", i.e., the saponified ethylene-vinyl acetate copolymer (ethylene-vinyl acetate-vinyl alcohol terpolymer) contains relatively few pendant acetate groups compared to the pendant hydroxyl groups.

Applicant believes that the tubular structure of the present invention wherein the tubular structure is formed from an ethylene-vinyl acetate copolymer sufficiently distinguishes over the tubular structure of Igarashi et al which contains a CPR resin or a CPR resin containing a saponified ethylene-vinyl acetate copolymer. However, by this supplemental amendment, applicant has canceled certain claims and amended Independent claim 1 (the only independent claim remaining) such the present claims now preclude the presence of both the CPA resin and the CPA resin containing saponified ethylene-vinyl acetate copolymer of Igarashi et al. Accordingly, in view of the foregoing amendments and remarks, it is believed that this application is now in condition for allowance, and an early indication thereof is earnestly solicited.

A person skilled in the art would recognize the distinctions between a saponified ethylene-vinyl acetate copolymer and an ethylene-vinyl acetate copolymer and, furthermore, such person skilled in the art would understand that the two polymers have different characteristics and properties, in addition to having different structures.

The examiner alleges that that applicant's statement "[g]as relates to the state of the material" is unsupported and that applicant has not provided convincing evidence showing that Igarashi et al intends "gas" to refer solely, or at all, to "state of the material". In this regard,

applicant refers to "The American Heritage Dictionary of the English Language, New College Edition" which defines "gas" as "[t]he state of matter distinguished from the solid and liquid states...", and further to "Hawley's Condensed Chemical Dictionary, Twelfth Edition", which defines "gas" as "[a] state of matter...".

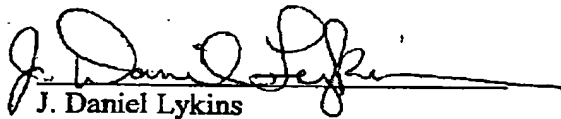
The examiner has pointed to page 12 of the After Final Amdt. And suggests that applicant's statement that "[t]he saponified ethylene-vinyl acetate copolymer of Igarashi et al is more appropriately characterized as being a CPA-ethylene-vinyl acetate-saponified vinyl acetate - vinyl alcohol terpolymer when the degree of saponification is less than 100%" is incorrect (and unsupported). The examiner is totally correct. This statement is an inadvertent editorial error on the part of the applicant. What Applicant intended to say was that the saponified ethylene-vinyl acetate copolymer of Igarashi et al is more appropriately characterized as being ~~a CPA-~~ an ethylene-vinyl acetate-vinyl alcohol terpolymer. Applicant apologizes for the error.

With respect to the examiner's statement on page 5 of the Advisory Action, that claim 10 does not recite that the copolymer "[h]as a vinyl acetate content of up to about 90% based on the weight of the copolymer" as applicant seems to state on page 13 of the After Final Amdt. With the above amendment wherein claim 10 has been canceled, this matter is now moot.

In view of the forgoing amendments and remarks, it is believed that the present application is now in condition for allowance and an early indication thereof is earnestly solicited.

Respectfully submitted,

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